

CLAIMS

1. An apparatus for identifying a concentration of a urea of a urea solution, comprising:

a urea concentration identifying chamber for causing an identified urea solution introduced into a urea concentration identifying apparatus body to stay temporarily;

a urea concentration identifying sensor heater provided in the urea concentration identifying chamber; and

a liquid temperature sensor provided in the urea concentration identifying chamber apart from the urea concentration identifying sensor heater at a constant interval;

the urea concentration identifying sensor heater including a heater and an identifying liquid temperature sensor provided in the vicinity of the heater, and

the apparatus further comprising an identification control portion for applying a pulse voltage to the urea concentration identifying sensor heater for a predetermined time, heating the identified urea solution staying temporarily in the urea concentration identifying chamber by the heater and identifying the concentration of the urea with a voltage output difference V_0 corresponding to a temperature difference between an initial temperature and a peak temperature in the identifying liquid temperature sensor.

2. The apparatus for identifying a concentration of a urea

of a urea solution according to claim 1, wherein the voltage output difference V0 is equal to a voltage difference between an average initial voltage V1 obtained by sampling an initial voltage before application of the pulse voltage at a predetermined number of
5 times and an average peak voltage V2 obtained by sampling a peak voltage after the application of the pulse voltage at a predetermined number of times, that is,

$$V0 = V2 - V1.$$

3. The apparatus for identifying a concentration of a urea
10 of a urea solution according to claim 1 or 2, wherein the identification control portion identifies a concentration of a urea of a urea solution with the voltage output difference V0 obtained for the identified urea solution based on calibration curve data to be a correlation of a voltage output difference
15 with a temperature for a predetermined reference urea solution prestored in the identification control portion.

4. The apparatus for identifying a concentration of a urea of a urea solution according to any of claims 1 to 3, wherein the identification control portion correlates a liquid type
20 voltage output Vout for the voltage output difference V0 at a measuring temperature of the identified urea solution with an output voltage for a voltage output difference at a measuring temperature for a predetermined threshold reference urea solution and thus carries out a correction.

5. The apparatus for identifying a concentration of a urea of a urea solution according to any of claims 1 to 3, wherein the urea concentration identifying sensor heater is a laminated urea concentration identifying sensor heater in which a heater and an identifying liquid temperature sensor are laminated through an insulating layer.

6. The apparatus for identifying a concentration of a urea of a urea solution according to any of claims 1 to 5, wherein the heater and the identifying liquid temperature sensor in the urea concentration identifying sensor heater are constituted to come in contact with the identified urea solution through a metallic fin, respectively.

7. The apparatus for identifying a concentration of a urea of a urea solution according to any of claims 1 to 6, wherein the liquid temperature sensor is constituted to come in contact with the identified urea solution through the metallic fin.

8. A method for identifying a concentration of a urea of a urea solution, comprising the steps of:

applying a pulse voltage for a predetermined time to a urea concentration identifying sensor heater including a heater and an identifying liquid temperature sensor provided in the vicinity of the heater;

heating an identified urea solution by the heater; and
identifying the concentration of the urea with a voltage

output difference V0 corresponding to a temperature difference between an initial temperature and a peak temperature in the identifying liquid temperature sensor.

9. The method for identifying a concentration of a urea of
5 a urea solution according to claim 8, wherein the voltage output difference V0 is equal to a voltage difference between an average initial voltage V1 obtained by sampling an initial voltage before application of the pulse voltage at a predetermined number of times and an average peak voltage V2 obtained by sampling a peak
10 voltage after the application of the pulse voltage at a predetermined number of times, that is,

$$V0 = V2 - V1.$$

10. The method for identifying a concentration of a urea of a urea solution according to claim 8 or 9, wherein a concentration
15 of a urea of a urea solution is identified with the voltage output difference V0 obtained for the identified urea solution based on calibration curve data to be a correlation of a voltage output difference with a temperature for a predetermined reference urea solution which is prestored.

20 11. The method for identifying a concentration of a urea of a urea solution according to any of claims 8 to 10, wherein a liquid type voltage output Vout for the voltage output difference V0 at a measuring temperature of the identified urea solution is correlated with an output voltage for a voltage output

difference at a measuring temperature for a predetermined threshold reference urea solution and is thus corrected.

12. The method for identifying a concentration of a urea of a urea solution according to any of claims 8 to 11, wherein the
5 urea concentration identifying sensor heater is a laminated urea concentration identifying sensor heater in which a heater and an identifying liquid temperature sensor are laminated through an insulating layer.

13. The method for identifying a concentration of a urea of
10 a urea solution according to any of claims 8 to 12, wherein the heater and the identifying liquid temperature sensor in the urea concentration identifying sensor heater are constituted to come in contact with the identified urea solution through a metallic fin, respectively.

14. The method for identifying a concentration of a urea of
15 a urea solution according to any of claims 8 to 13, wherein the liquid temperature sensor is constituted to come in contact with the identified urea solution through the metallic fin.

15. An apparatus for reducing an exhaust gas of a car,
20 comprising:

a urea solution supplying mechanism for supplying a urea solution to an upstream side of a catalytic device,

wherein the urea solution supplying mechanism is constituted by a urea solution tank for storing the urea solution,

a urea pump and a urea spraying device for spraying the urea solution fed from the urea pump to the upstream side of the catalytic device, and

the apparatus for identifying a concentration of a urea of a urea solution according to any of claims 1 to 7 is provided in the urea tank or on an upstream side or a downstream side of the urea pump.

16. A method for reducing an exhaust gas of a car, comprising the steps of:

supplying a urea solution to an upstream side of a catalytic device through a urea solution supplying mechanism constituted by a urea solution tank for storing the urea solution, a urea pump and a urea spraying device for spraying the urea solution fed from the urea pump onto the upstream side of the catalytic device, and

identifying a concentration of a urea of the urea solution in the urea tank or on an upstream side or a downstream side of the urea pump by using the method for identifying a concentration of a urea of a urea solution according to any of claims 8 to 14.